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## METEOROLOGICAL SUMMARY FOR 1877.

Prof. F. H. Snow's Annual Report as Meteorologist to the State Board of Agriculture.

Station: Lawrence, Kansas. Latitude,  $38^{\circ} 57' 25''$ ; longitude,  $95^{\circ} 15'$ ; elevation of barometer and thermometers, 875 feet above the sea level, and five feet above the ground; rain gauge on the ground; anemometer, 105 feet above the ground, on the dome of the University building, 1,200 feet above the sea level.

The chief characteristics of the weather of 1877 were the large and well-distributed rainfall, the low temperature of the summer months, the high temperature of the winter months, the unusual degree of atmospheric humidity, and the comparative lightness of the winds.

## TEMPERATURE.

Mean temperature of the year,  $54^{\circ}.16$ , which is  $1^{\circ}.33$  above the mean of the nine preceding years. The highest temperature was  $99^{\circ}$ , on the 7th of July; the lowest was  $9^{\circ}$  below zero, on the 16th of January, giving a yearly range of  $108^{\circ}$ . Mean temperature at 7 a. m.,  $48^{\circ}.54$ ; at 2 p. m.,  $62^{\circ}.50$ ; at 9 a. m.,  $52^{\circ}.81$ .

Mean temperature of the winter months,  $36^{\circ}.56$ , which is  $7^{\circ}.71$  above the average winter temperature; of the spring,  $52^{\circ}.81$ , which is  $0^{\circ}.02$  above the average; of the summer,  $73^{\circ}.75$ , which is  $2^{\circ}.86$ , below the average; of the autumn,  $53^{\circ}.54$ , which is  $1^{\circ}.20$  above the average.

The coldest month of the year was January, with a mean temperature of  $25^{\circ}.60$ ; the coldest week was January 7th to 13th, with mean temperature,  $17^{\circ}.49$ ; the coldest day was January 12th, with mean temperature,  $3^{\circ}.2$ . The mercury fell below zero but three times, all of which were in January.

The warmest month of the year was July, with a mean temperature of  $75^{\circ}.13$ ; the warmest week was July 2d to 8th, with mean temperature  $82^{\circ}.64$ ; the warmest day was July 7th, with mean temperature,  $86^{\circ}$ . The mercury reached or exceeded  $90^{\circ}$  on only twenty days, viz; four in June, eight in July, seven in August, and one in September.

The last light frost of spring was on May 1st; the first light frost of autumn was on October 4th, giving an interval of 156 days entirely without frost. The last severe frost of spring was on April 2d; the first severe frost of autumn was on November 5th, giving an interval of fully seven months, or 217 days, without severe frost. No frost or cold weather during the year caused any damage to fruit or fruit buds.

## RAIN.

The entire amount of rain, including melted snow, was 41.09 inches, which is 6.71 inches above the average annual amount for the nine preceding years. Either rain or snow fell on 126 days, which is the largest number of rainy days in any year of our record. The longest interval without rain during the growing season, (March 1st to September 15th), was ten days, July 27th to August 6th. The number of thunder showers was thirty-nine, of which two occurred in December.

## SNOW.

The entire depth of snow was  $15\frac{1}{2}$  inches, of which 8 inches fell in

January, 2 inches in February, 5 inches in March, and half an inch in December. The last snow of spring was on April 3d; the first snow of autumn was on November 8th.

#### FACE OF THE SKY.

The average cloudiness of the year was 47.12 per cent., which is 2.16 per cent above the average. The number of clear days (less than one-third cloudy) was 162; half-clear days (from one-third to two-thirds cloudy), 92; cloudy (more than two-thirds), 111. There were 51 entirely clear and 50 entirely cloudy days. The clearest was August, with an average cloudiness of 29.57 per cent.; the cloudiest month was May, with an average of 62.93 per cent. The mean cloudiness at 7 a. m., was 51.14 per cent.; at 2 p. m., 50.74 per cent.; at 9 p. m., 39.48 per cent.

#### DIRECTION OF WIND.

During the year, three observations daily, the wind was from the N. W. 278 times; S. W., 259 times; S. E., 184 times; N. E., 148 times; S., 80 times; N., 59 times; E., 38 times; W., 18 times; calm, 31 times. The south winds (including southwest, south and southeast), outnumbered the north winds (including northwest, north and northeast), in the ratio of 523 to 485.

#### VELOCITY OF THE WIND.

The number of miles traveled by the wind during the year was 113,967, which is 33,485 miles less than the average annual distance for the past five years. This gives a mean daily velocity of 312.24 miles, and an average hourly velocity of 13.01 miles. The highest hourly velocity was 55 miles, on March 16th and November 5th; the highest daily velocity was 969 miles on March 8th; the highest monthly velocity was 13,981 miles, in March. The three windiest months were March, April and May; the three calmest months were August, September and October. The average hourly velocity of the wind at 7 a. m., was 11.66 miles; at 2 p. m., 15.55 miles; at 9 p. m., 12.54 miles.

#### BAROMETER.

Mean height of the barometer, 29.117 inches; mean at 7 a. m., 29.140 inches; at 2 p. m., 29.093 inches; at 9 p. m., 29.120 inches. Maximum, 29.751 inches, on January 22d; minimum, 28.364 inches, on April 18th; yearly range, 1.387 inches. The highest monthly mean was 29.301 inches, in February; the lowest was 28.995 inches, in April. The barometer observations are corrected for temperature and instrumental error.

#### RELATIVE HUMIDITY.

The average atmospheric humidity for the year was 72.6; at 7 a. m., 82.12; at 2 p. m., 56.76; at 9 p. m., 79.09. The dampest month was October, with mean humidity, 79.36; the driest month was April, with mean humidity, 64.90. There were eleven fogs during the year. The lowest humidity for any single observation was 22.5, on April 5th.

The following tables give the mean temperature, the extremes of temperature, the velocity of the wind, the percentage of cloudiness, the relative humidity, and the rainfall for each month of the year 1877, and a comparison with preceding years:

## YEAR 1877.

MONTHS	MEAN TEMPERATURE	MAXIMUM TEMPERATURE	MINIMUM TEMPERATURE	MILES OF WIND	CLOUDINESS	RELATIVE HUMIDITY	RAINFALL IN INCHES
January .....	25.60	62.5	-9.0	9,178	48.8	75.5	1.17
February .....	39.65	66.0	21.0	7,718	47.1	71.8	0.80
March .....	40.03	81.0	7.0	13,981	54.1	67.2	3.40
April .....	53.90	81.0	25.0	11,976	53.0	64.9	3.13
May .....	64.50	85.0	37.0	11,522	62.9	72.0	6.45
June .....	72.03	95.0	47.0	8,741	38.7	75.3	7.20
July .....	75.13	99.0	54.0	8,355	32.0	73.4	5.76
August .....	74.10	97.0	51.5	7,972	29.5	72.0	2.30
September .....	66.93	90.0	43.0	6,817	33.5	71.7	1.35
October .....	54.45	80.0	34.0	7,530	58.5	79.4	5.85
November .....	39.53	64.0	9.0	9,494	48.9	73.8	1.47
December .....	44.43	68.0	10.0	10,683	58.1	74.4	2.21

## COMPARISON WITH PREVIOUS YEARS.

Year 1876 .....	52.76	98.0	- 5.0	148,120	41.27	66.8	44.18
" 1875 .....	50.60	99.0	-16.5	145,316	44.81	65.5	28.87
" 1874 .....	54.20	108.0	- 3.0	145,865	45.54	65.5	28.87
" 1873 .....	52.71	104.0	-26.0	154,508	42.46	64.0	32.94
" 1872 .....	51.90	97.0	-18.0	.....	44.33	64.4	32.63
" 1871 .....	54.30	103.0	- 6.0	.....	48.37	.....	33.23
" 1870 .....	54.50	102.0	-10.0	.....	47.88	68.4	31.38
" 1869 .....	50.99	96.0	- 5.0	.....	49.23	.....	38.51
" 1868 .....	53.36	101.0	-16.5	.....	42.35	.....	37.42

In presenting the above report, I desire to acknowledge my indebtedness to Prof. F. O. Marvin for taking the observations during my six weeks' absence in the summer vacation.